

### **REMARKS/ARGUMENTS**

Reconsideration of this application and entry of this Amendment are solicited. Claims 20 and 22-29 will be active in the application subsequent to entry of this Amendment.

It is proposed to amend claim 20 to recite that the step of sintering or firing is one taken after a complete stack of the plurality of layers is completed and in a single operation. This amendment is based upon the description of the invention and in particular paragraph [0055], hence the amendment does not introduce added subject matter to the disclosure.

The sole issue raised in the outstanding Official Action is the patentability of the claims over what amounts to a combination of two references. For the purpose of this response applicants will focus on claim 20 while the dependent claims will enjoy the benefits of patentability due to their dependency from claim 20; *see* M.P.E.P. §2143.03 citing *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988).

The examiner argues that the present application is “obvious” in light of Jacobsen (US 6,294,401) and Zheng (US 6,838,203). In particular, the examiner believes that it would be obvious to combine the teaching of both documents in order to create solid oxide fuel cell (SOFC) as taught by the present claim 20. The Examiner also rejected the arguments filed in the response of February 27, 2008 as the cited prior art “need not recognize any specific advantages disclosed in the instant specification in order to render obvious”. This is an incorrect statement of the law.

To establish a case of *prima facie* obviousness, all of the claim limitations must be taught or suggested by the prior art. *See* M.P.E.P. § 2143.03. A claimed invention is unpatentable if the differences between it and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. *In re Kahn*, 78 USPQ2d 1329, 1334 (Fed. Cir. 2006) citing the legal standard provided in *Graham v. John Deere*, 148 USPQ 459 (1966). The *Graham* analysis needs to be made explicitly. *KSR v. Teleflex*, 82 USPQ2d 1385, 1396 (2007). It requires findings of fact and a rational basis for combining the prior art disclosures to produce the claimed invention. *See id.* (“Often, it will be necessary for a court to look to interrelated teachings of multiple patents . . . and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine

whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue“).

The use of hindsight reasoning is impermissible. *See id.* at 1397 (“A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon ex post reasoning”). Thus, a *prima facie* case of obviousness under Section 103(a) requires “some rationale, articulation, or reasoned basis to explain why the conclusion of obviousness is correct.” *Kahn*, 78 USPQ2d at 1335; see *KSR*, 82 USPQ2d at 1396.

A claim which is directed to a **combination of prior art elements “is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.”** *Id.* at 1396. Finally, a **determination of *prima facie* obviousness requires a reasonable expectation of success.** See *In re Rinehart*, 189 USPQ 143, 148 (C.C.P.A. 1976).

Turning now to the merits, applicants respectfully disagree with the Examiner’s assertion that the combination of Zheng and Jacobsen would firstly would not reproduce the claimed invention (no reasonable expectation of success) and secondly be obvious (not obvious even if each element was independently known in the art).

The Examiner asserts that the person of ordinary skill would combine Zheng and Jacobsen without recognizing the specific advantages and accordingly the combination is obvious. The applicants respectfully disagree, as the combination of Zheng and Jacobsen would not result in the claimed invention.

Zheng requires the sintering of the fuel cell after the application of each layer (column 8, line 64 to column 9, line 9) as does Jacobsen (column 6, lines 10 to 35) where annealing occurs after deposition of each layer or for each bulk material where heating or annealing is required for each layer.

In complete contrast, there is **no** requirement for such chemical manipulation after the deposition of each nanoparticle layer, or bulk material in the present invention. This feature is a clearly advantageous and a key part of the invention, and the combination of the cited documents would not result in such a feature.

Claim 1 specifically does not teach the sintering of the layers after each stage and paragraph [0055] explicitly states that “a complete stack can be built-up and subsequently sintered in a single operation rather than a series of laying up and sintering operations required in

the prior art” thereby clearly distinguishing it from the cited prior art. The single sintering stage has several obvious benefits in terms of ease and speed of manufacture of the fuel cells.

As explained above, applicants have amended claim 20 to reflect the disclosure that a complete stack is built up and subsequently sintered in a single operation which is in contrast to a series of laying up and sintering operations which is the case of the prior art relied upon by the examiner.

Finally, applicants note that there is no teaching or suggestion in either Jacobsen or Zheng that the methods for printing involved would be applicable to create cathodes, anodes or electrolytes. The present invention describes in detail the requirements for making the inks, and the problems overcome. The slurries used in Zheng would lead to problems with blockage and with the Van der Waals force between the ink particles (see paragraph [0034] of the present application) and it is not apparent and there is no reasonable expectation of success that the combination of both documents would result in an ink capable of forming cathodes, anodes or electrolytes.

*KSR vs. Telflex*, states that combinations “of familiar elements according to known elements is likely to be obvious where it does no more than yield predictable results.” Contrary to the Examiner’s assertions the combination of the nanoparticle printing and the method of forming a solid oxide fuel cell **does not yield solely predictable results**. Firstly, as discussed in the response of February 27, 2008, there is no suggestion in the prior art documents that nanoparticle printing reduces ohmic losses, reduces thermal mismatches or improves interconnects. There are several benefits associated with these properties which are unpredictable and beneficial and therefore clearly non-obvious. For example, as discussed above, the method of the invention allows for the complete build up of a stack and sintering in a single operation rather than the layering and sintering required in the prior art. Additionally, the reduction of the ohmic losses allows the cells to operate at lower temperatures than those found in the prior art [0017]. Neither of the cited documents teach or suggest these benefits, and the combination of these features clearly do more than yield predictable results. Accordingly, the combination of the methods is non-obvious.

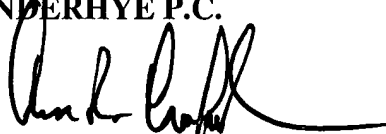
For at least the above reasons, applicants submit that claim 20 is novel and non-obvious. As the remaining claims 21 to 29 are dependent on claim 20 it follows that they are also novel and non-obvious for at least the same reasons; *see* MPEP §2143.03.

For the above reasons it is respectfully submitted that the claims define patentable subject matter. Reconsideration, entry of this Amendment and allowance are solicited.

Respectfully submitted,

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